



2015 NIAC Fall Symposium

Seattle, Washington - October 27-29, 2015



Tuesday, October 27

- 8:30 **Welcome & Overview** *Jason Derleth, NIAC Program Executive*
- 9:00 **Keynote Address** *Dava Newman, NASA Deputy Administrator*
- 10:00 Break**
- 10:20 *Justin Atchison, Johns Hopkins University, Swarm Flyby Gravimetry*
- 10:45 *Bin Chen, Univ. California Santa Cruz, 3D Photocatalytic Air Processor for Dramatic Reduction of Life Support Mass and Complexity*
- 11:10 *Jeffrey Nosanov, Nosanov Consulting, PERISCOPE: PERIapsis Subsurface Cave Optical Explorer*
- 11:35 *Steven Oleson, NASA GRC, Titan Submarine: Exploring the Depths of Kraken Mare*
- 12:00 Lunch**
- 1:30 *William Engblom, Embry-Riddle Aeronautical University, Virtual Flight Demonstration of Stratospheric Dual-Aircraft Platform*
- 1:55 *John Graf, NASA JSC, Thirsty Walls - A new paradigm for air revitalization in life support*
- 2:20 *Michael Hecht, MIT Haystack Observatory, A Tall Ship and a Star to Steer Her By*
- 2:45 *John Lewis, Deep Space Industries, In-Space Manufacture of Storable Propellants*
- 3:10 Break**
- 3:30 *Robert Youngquist, NASA KSC, Cryogenic Selective Surfaces*
- 3:55 *Thomas Prettyman, Planetary Science Institute, Deep mapping of small solar system bodies with galactic cosmic ray secondary particle showers*
- 4:20 *Marco Quadrelli, NASA JPL, Orbiting Rainbows*
- 4:45 *Christopher Walker, University of Arizona, 10 meter Sub-Orbital Large Balloon Reflector (LBR)*
- 5:10 **Adjourn**
- 5:30 **NIAC Fellows Social Event: TBD**



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Wednesday, October 28

- 8:30 **NIAC Plans and Announcements** *Jason Derleth, NIAC Program Executive*
- 9:00 **Keynote Address** *Greg Bear, Science Fiction Author*
- 10:00 Break**
- 10:20 *S.J. Ben Yoo, University of California, Davis, Low-Mass Planar Photonic Imaging Sensor*
- 10:45 *Michael Paul, Pennsylvania State Univ., SCEPS in Space - Non-Radioisotope Power Systems for Sunless Solar System Exploration Missions*
- 11:10 *Adrian Stoica, NASA JPL, Trans-Formers for Lunar Extreme Environments: Ensuring Long-Term Operations in Regions of Darkness and Low Temperatures*
- 11:35 *Bruce Wiegmann, NASA MSFC, Heliopause Electrostatic Rapid Transit System (HERTS)*
- 12:00 Lunch**
- 1:30 *Philip Lubin, Univ. of California Santa Barbara, DEEP IN Directed Energy Propulsion for Interstellar Exploration*
- 1:55 *Steven Oleson, NASA GRC, Triton Hopper: Exploring Neptune's Captured Kuiper Belt Object*
- 2:20 *Mason Peck, Cornell University, Soft-Robotic Rover with Electrodynamic Power Scavenging*
- 2:45 *Jeffrey Plescia, Johns Hopkins University, Seismic Exploration of Small Bodies*
- 3:10 Break**
- 3:30 *Larry Paxton, Johns Hopkins University, CRICKET: Cryogenic Reservoir Inventory by Cost-Effective Kinetically Enhanced Technology*
- 3:55 *Joel Sercel, ICS Assoc., APIS (Asteroid Provided In-Situ Supplies):100MT Of Water from a Single Falcon 9*
- 4:20 *Adrian Stoica, NASA JPL, WindBots: persistent in-situ science explorers for gas giants*
- 4:45 *Nelson Tabirian, BEAM Engineering for Advanced Measurements Co., Thin-Film Broadband Large Area Imaging System*
- 5:10 Adjourn**
- 5:00-7:00** *Dinner on your own*
- 7:00-8:30** Lecture: "NIAC- Essentials of Technological Creativity and Invention"
NIAC Phase I & Phase II Fellow Berok Khoshnevis, University of Southern California



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Thursday, October 29

- 8:30 **Other Topics** *NIAC Staff*
- 9:00 **Keynote Address** *Leslie Young, New Horizons Deputy Project Scientist,
Southwest Research Institute, New Horizons, Johns Hopkins University
"NASA's New Horizons Mission to the Pluto System"*
- 10:00 Break**
- 10:20 *Melville Ulmer, Northwestern University, Aperture: A Precise Extremely large Reflective Telescope Using
Re-configurable Elements*
- 10:45 *Joseph Wang, Univ. Southern California, CubeSat with Nanostructured Sensing Instrumentation for
Planetary Exploration*
- 11:10 *Marco Pavone, Stanford University, Spacecraft/Rover Hybrids for the Exploration of Small Solar System
Bodies*
- 11:35 NIAC Q&A** *Jason Derleth, NIAC Program Executive*
- 12:00 Adjourn**



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ABOUT NIAC:

The NASA Innovative Advanced Concepts (NIAC) Program supports early studies of visionary concepts that could one day “change the possible” in space and aeronautics. NIAC studies develop and assess revolutionary, yet credible, aerospace architecture, mission, and system concepts. They aim to enable far-term capabilities, and spawn exciting innovations to radically improve aerospace exploration, science, and operations.

NIAC also contributes to the Nation's leadership in key research and technology areas, and fosters outreach, education, and economic benefits. Part of the Space Technology Mission Directorate, NIAC is the most open-ended and far-reaching program in NASA.

2015 NIAC SYMPOSIUM SPEAKERS:



Keynote Address
Dava Newman
Deputy Administrator, NASA

Dr. Dava Newman was nominated in January 2015 by President Barack Obama and confirmed by the U.S. Senate in April 2015 to serve as the Deputy Administrator of the National Aeronautics and Space Administration. She was sworn in on May 15 and began her duties with the agency on May 18.

Along with NASA Administrator Charles Bolden, Newman is responsible to the agency administrator for providing overall leadership, planning, and policy direction for NASA. Newman performs the duties and exercises the powers delegated by the administrator, assists the administrator in making final agency decisions, and acts for the administrator in his absence by performing all necessary functions to govern NASA operations and exercises the powers vested in the agency by law. Newman also is responsible for articulating the agency's vision and representing NASA to the Executive Office of the President, Congress, heads of federal and other appropriate government agencies, international organizations, and external organizations and communities.

Prior to her tenure with NASA, Newman was the Apollo Program Professor of Aeronautics at the Massachusetts Institute of Technology (MIT) in Cambridge. Her expertise is in multidisciplinary research that encompasses aerospace biomedical engineering.

Newman's research studies were carried out through space flight experiments, ground-based simulations, and mathematical modeling. Her latest research efforts included: advanced space suit design, dynamics and control of astronaut motion, mission analysis, and engineering systems design and policy analysis. She also had ongoing efforts in assistive technologies to augment human locomotion here on Earth.

Newman is the author of *Interactive Aerospace Engineering and Design*, an introductory engineering textbook published by McGraw-Hill, Inc. in 2002. She also has published more than 250 papers in journals and refereed conferences.

As a student at MIT, Newman earned her Ph.D. in aerospace biomedical engineering in 1992 and Master of Science degrees in aerospace engineering and technology and policy in 1989. She earned her Bachelor of Science degree aerospace engineering from the University of Notre Dame in 1986.



Keynote Address
Greg Bear
Science Fiction Author

Greg Bear has thoroughly explored outlandish schemes for achieving deep space in novels such as *Eon*, *Anvil of Stars*, *Moving Mars*, and *Hull Zero Three*. (That last uses a method that is probably the most convincing of any yet devised for achieving interstellar distances.) His most recent linked novels, *War Dogs* and *Killing Titan*, take us from the dusty deserts of Mars to the inner ocean of Titan, and soon volume three, *Take Back the Sky*, will explore the Kuiper Belt and the Oort cloud, using a thoroughly outlandish space drive that to his knowledge has never been described before.



Keynote Address
Leslie Young
New Horizons Deputy Project Scientist
Southwest Research Institute

Dr. Leslie Young received her Ph.D. from MIT in 1994, and has devoted her career to the study of the outer solar system, in particular Pluto and its surroundings. She has been associated with NASA's Ames Research Center and Boston University, prior to joining the staff of the Southwest Research Institute in Boulder, Colorado in 1999. She works extensively on the New Horizons mission to Pluto and the Kuiper Belt, and led the planning for the science observations for the New Horizons encounter with the Pluto system.